The Information Age

Economy, Society, and Culture

Volume I

The Rise of the Network Society

"We live today in a period of intense and puzzling transformation, signalling perhaps a move beyond the industrial era altogether. Yet where are the great sociological works that chart this transition? Hence the importance of Manuel Castells' multivolume work, in which he seeks to chart the social and economic dynamics of the information age . . . [It] is bound to be a major reference source for years to come." (Anthony Giddens, *The Times Higher Education Supplement*)

"A brief review cannot do it justice. No other scholar has approached the subject of the information age in as engaging and innovative a way as this author. Strongly recommended for academic libraries." (*Choice*)

A little over a decade since its first publication, the hypotheses set out in Manuel Castells' groundbreaking trilogy have largely been verified. In a substantial new preface to the first volume in the series, Castells demonstrates, in the light of major world trends, how the network society has now fully risen on a global scale.

The book discusses how the global economy is now characterized by the almost instantaneous flow and exchange of information, capital, and cultural communication. These flows order and condition both consumption and production. The networks themselves reflect and create distinctive cultures. Both they and the traffic they carry are largely outside national regulation. Our dependence on the new modes of informational flow gives to those in a position to control them enormous power to control us. The main political arena is now the media, and the media are not politically answerable.

Based on research in the USA, Asia, Latin America, and Europe, Castells formulates a systematic theory of the information society and details the new social and economic developments brought by the Internet and the "new economy."

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The Rise of the Network Society

Second edition
With a new preface

Manuel Castells

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For Emma Kiselyova-Castells,
without whose love, work, and support
this book would not exist

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Preface to the 2010 Edition of *The Rise of the Network Society*

We live in confusing times, as is often the case in periods of historical transition between different forms of society. This is because the intellectual categories that we use to understand what happens around us have been coined in different circumstances, and can hardly grasp what is new by referring to the past. I contend that around the end of the second millennium of the common era a number of major social, technological, economic, and cultural transformations came together to give rise to a new form of society, the network society, whose analysis is proposed in this volume.

The urgency for a new approach to understanding the kind of economy, culture, and society in which we live is heightened by the crises and conflicts that have characterized the first decade of the twenty-first century. The global financial crisis; the upheaval in business and labor markets resulting from a new international division of labor; the unstoppable growth of the global criminal economy; the social and cultural exclusion of large segments of the population of the planet from the global networks that accumulate knowledge, wealth, and power; the backlash of the disaffected in the form of religious fundamentalism; the rekindling of national, ethnic, and territorial cleavages, ushering in the negation of the other, and thus the widespread resort to violence as a way of protest and domination; the environmental crisis epitomized by climate change; the growing incapacity of political institutions based on the nation-state to handle global problems and local demands: these are all diverse expressions of a process of multidimensional, structural change that takes place in the midst of agony and uncertainty. These are indeed troubled times.

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The sense of disorientation is compounded by radical changes in the realm of communication, derived from the revolution in communication technologies. The shift from traditional mass media to a system of horizontal communication networks organized around the Internet and wireless communication has introduced a multiplicity of communication patterns at the source of a fundamental cultural transformation, as virtuality becomes an essential dimension of our reality. The constitution of a new culture based on multimodal communication and digital information processing creates a generational divide between those born before the Internet Age (1969) and those who grew up being digital.

These are among the themes treated in the trilogy of which this book is the first volume, published in 1996 (1st edition) and 2000 (2nd edition). The book did not contain any predictions, as I always kept my distance, as a researcher, from the dubious ventures of futurology. But I identified a number of trends that were already present and observable in the last two decades of the first century, and I tried to make sense of their meaning by using standard social science procedures. The result was the discovery of a new social structure in the making, which I conceptualized as the network society because it is made of networks in all the key dimensions of social organization and social practice. Moreover, while networks are an old form of organization in the human experience, digital networking technologies, characteristic of the Information Age, powered social and organizational networks in ways that allowed their endless expansion and reconfiguration, overcoming the traditional limitations of networking forms of organization to manage complexity beyond a certain size of the network. Because networks do not stop at the border of the nation-state, the network society constituted itself as a global system, ushering in the new form of globalization characteristic of our time. However, while everything and everybody on the planet felt the effects of this new social structure, global networks included some people and territories while excluding others, so inducing a geography of social, economic, and technological inequality. In a parallel development, social movements and geopolitical strategies became largely global so as to act on the global sources of power, while the institutions of the nation-state inherited from the Modern Age and from the industrial society gradually lost their capacity to control and regulate global flows of wealth and information. The historical irony is that nation-states were among the most active agents of globalization as they tried to ride the tiger of unfettered markets and free flows of capital and technology for their own benefit.

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By studying empirically the contours of these social and organizational arrangements on a global scale, I ended up with a series of specific analyses on different dimensions of the network society that appeared to be coherent, so that together they provided a canvas of interpretation of events and trends that at first sight seemed to be disjointed.

Thus, while this volume, and this trilogy, does not present a formal, systematic theory of society, it proposes new concepts and a new theoretical perspective to understand the trends that characterize the structure and dynamics of our societies in the world of the twenty-first century.

The relevance of a social theory, beyond the empirical body of evidence gathered to support specific arguments, ultimately comes from its capacity to explain social evolution, either in society at large or in certain dimensions of society. Or, at least, to yield a more fruitful interpretation than alternative analytical frameworks used to study the determinants and consequences of human action in the space and time of the analysis. Seen from this perspective, the first decade of the twenty-first century offers a privileged terrain of observation to gauge the explanatory value of the grounded hypotheses put forward in the pages of this book more than 10 years ago. Again, this is not to verify predictions, since there were none, but to evaluate how accurate was the early identification of major social trends whose development has constituted the fabric of our lives in this historical period. Not so much to vindicate the author of the analysis (he does not feel any such need) as to make further use of the conceptual tools that provided a synthetic view of the process of transformation of our world. Or else to discard those concepts that were of little help in understanding our prospects, dramas, and dilemmas.

Let me review some of the key developments of the last decade, relating them to the analyses presented in this book. I will focus on those trends that refer to the structural analysis offered in this volume, leaving to the new prefaces of volumes II and III the task of proceeding with a similar operation in relationship to the themes treated in those volumes.

I

The global financial crisis that exploded towards the end of 2008 and sent the global economy into a tail spin was the direct consequence of the specific dynamics of this global economy, as analyzed in chapter 2 of this volume. It resulted from the combination of six factors. First, the technological transformation of finance that provided the basis for

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the constitution of a global financial market around global computer networks, and equipped financial institutions with computational capacity to operate advanced mathematical models. These models were deemed to be capable of managing the increasing complexity of the financial system, operating globally interdependent financial markets through electronic transactions effected at lightning speed. Second, the liberalization and deregulation of financial markets and financial institutions, allowing the quasi-free flow of capital across the world, and overwhelming the regulatory capacity of national regulators. Third, the securitization of every economic organization, activity, or asset, making financial valuation the paramount standard to assess the value of firms, governments, and even entire economies. Furthermore new financial technologies made possible the invention of numerous exotic financial products, as derivatives, futures, options, and securitized insurance (such as credit default swaps) became increasingly complex and intertwined, ultimately virtualizing capital and eliminating any semblance of transparency in the markets so that accounting procedures became meaningless. Fourth, the imbalance between capital accumulation in newly industrializing countries, such as China and oil-producing countries, and capital borrowing in the richest economies, such as the United States, led to a wave of adventurous lending to a crowd of consumers used to living on the edge of debt, exposing the lenders far beyond their financial capabilities. Fifth, because financial markets only partially function according to the logic of supply and demand, and are largely shaped by "information turbulences", as analyzed in this volume, the mortgage crisis that started in 2007 in the United States after the bursting of the real-estate bubble reverberated throughout the global financial system. Indeed, while a similar real-estate crash in Japan in the early 1990s had severe effects on the Japanese economy, its impact was limited on the rest of the world because of the much more limited interpenetration of securities and financial markets. Last, but not least, the lack of proper supervision in securities trading and financial practices enabled daring brokers to pump up the economy and their personal bonuses through increasingly risky lending practices.

The paradox is that the crisis was brewed in the cauldrons of the new economy, an economy defined by a substantial surge in productivity as the result of technological innovation, networking, and higher education levels in the work force, as analyzed in chapters 2 and 3 of this volume, and as I observed later on during the 2000s in other works. Indeed, focusing on the United States, where the crisis first started, between 1998 and 2008 cumulative productivity growth reached almost 30 percent. However, because of shortsighted

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and greedy management policies, real wages increased only by 2 percent over the decade, and in fact weekly earnings of college-educated workers fell by 6 percent between 2003 and 2008. And yet, real-estate prices soared during the 2000s and lending institutions fed the frenzy by providing mortgages, ultimately backed by Federal institutions, to the same workers whose wages were stagnant or diminishing. The notion was that productivity increases would ultimately catch up with wages as the benefits of growth would trickle down. It never happened because financial companies and realtors reaped the benefits of the productive economy, inducing an unsustainable bubble. The financial services industry's share of profits increased from 10 percent in the 1980s to 40 percent in 2007, and the value of its shares from 6 percent to 23 percent, while the industry only accounts for 5 percent of private-sector employment. In short, the very real benefits of the new economy were appropriated in the securities market and used to generate a much greater mass of virtual capital that multiplied its value by lending it to a multitude of avid consumers/borrowers. Moreover, the expansion of the global economy, with the rise of China, India, Russia, Brazil, and other industrializing economies to the forefront of capitalist growth, increased the risk of financial collapse by lending the capital accumulated in these economies to the United States and other markets in the world, so as to sustain the solvency and imports capability of these economies while taking advantage of favorable lending rates. The massive military spending by the US government to fund its adventure in Iraq was also financed through debt, to the point that Asian countries now hold a large share of US Treasury Bonds, intertwining the Asian Pacific and US fiscal policy in a decisive manner. While inflation was kept relatively in check throughout the OECD because of significant productivity growth, as proposed in my analysis, there was a growing gap between the scale of the lending and the ability of both consumers and institutions to repay what they borrowed. Household debt of disposable income in the United States grew from 3 percent in 1998 to 130 percent in 2008. As a result, prime mortgage delinquencies as a percentage of loans increased from 2.5 percent in 1998 to 118 percent in 2008.

Yet, no one could do much about it because the global financial market had escaped the control of any investor, government, or regulatory agency. It had become what in this volume I called a "global automaton" imposing its logic over the economy and society at large, including over its own creators. And so, a financial crisis of unprecedented proportions unfolds around the world at the time of writing, dramatically ending the myth of the self-regulated market,

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calling into question the relevance of some mainstream economic theories, and sending governments and business into a frantic scramble to tame the wild automaton that went into reverse and devoured tens of thousands of jobs (meaning family lives) on a daily basis. There is an urgent search for stabilizing remedies, but I fear that by looking for solutions in the formulas of Economics 101, we will be at a loss in the dark world resulting from the failure to regulate a new kind of economy under new technological conditions. This is why investigating the networked structure of our global, networked economy may help to design strategies and policies adapted to the realities of our time.

II

Work and employment have been transformed. But in contrast to the dystopias and utopias foreseen by prophets of doom or evangelists of a new economic age, the relationship between technology and the quantity and quality of jobs has followed the complex pattern of interaction outlined in chapter 4 of this volume. Overall, and in line with historical experience of earlier technological revolutions, technological change has not destroyed employment in aggregation, since some occupations have been phased out and others have been induced in greater numbers. In general terms, the occupational profile of the labor force has been enhanced in terms of required skills and educational level. On the other hand, by globalizing the process of production of goods and services, thousands of jobs, particularly in manufacturing, have been eliminated in advanced economies either by automation or by relocation to newly industrialized countries. Accordingly, hundreds of thousands of manufacturing jobs have been created in these locations so that, on balance, there are more manufacturing jobs than ever in the planet at large. Yet, this job creation and the increased education of the labor force has not resulted in a sustained improvement of living standards in the industrialized world. This is because the level of compensation for the majority of workers has not followed the growth of productivity and profits, while the provision of social services, and particularly of health, has been hampered by skyrocketing costs in health care and limitation of social benefits in the private sector. Only the massive entry of women in the labor force has prevented a decline in the standards of living for the majority of households. This feminization of the labor force has substantially affected the economic foundations of patriarchalism and has opened the way for the rise of woman

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consciousness documented in the second volume of my trilogy and in some of my recent writings. Immigration continues to play a significant role in economies and societies around the world, as labor gravitates toward job opportunities. It results in growing multiethnicity and multiculturalism almost everywhere. Globalization also changes the labor markets and places multiculturalism at the forefront of social dynamics. However, as documented in this volume, immigration is not as pervasive a phenomenon as it is usually perceived by native populations that often feel "invaded". While there are almost 250 million migrants in the world, this is a fraction of the global labor force, and affects different countries in different proportions. Yet, the concentration of immigrants in the core of major metropolitan areas in the world accrues their visibility and potential for social tensions. More often than not the growing multiethnicity of societies everywhere is confused with immigration. In fact, immigration is increasing, in spite of the rise of unemployment and heightened border controls, because the uneven development of an interdependent world and the networks of connectivity between societies (including the Internet) offer greater possibilities for the expansion of "transnationalism from below" in the terminology of some analysts of the new immigration.

The main trends of the new labor structure observed in the last decade have taken place along the lines identified in chapter 4 of this book. These are, on the one hand, the growing flexibility of labor, that is the reduction of the proportion of the labor force with long-term employment and a predictable career path, as new generations, the majority of whom are hired for their flexibility, replace an old labor force entitled to job security in large-scale firms. Business consultants and service entrepreneurs have replaced automobile workers and insurance underwriters. On the other hand, there has been a parallel growth of highly educated occupations and low-skill jobs, with very different bargaining power in the labor market. Exaggerating the terminology to capture the imagination of the reader, I labeled these two types of workers "self-programmable labor" and "generic labor". Indeed, there has been a tendency to increase the decision-making autonomy of educated knowledge workers who have become the most valuable assets for their companies. They are often referred to as "talent". On the other hand, generic workers, as executants of instructions, have continued to proliferate, as many menial tasks can hardly be automated and many workers, particularly youth, women, and immigrants, are ready to accept whatever conditions are necessary to get a job. This dual structure of the labor market is related to the structural conditions of a knowledge economy growing

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within the context of a large economy of low-skill services, and it is at the source of the growing inequality observed in most societies.

Information and communication technologies have had a powerful effect on the transformation of labor markets and of the work process. However, their effects have been substantially mediated by the strategies of firms and the policies of governments. Thus, when public support of labor unions provokes businesses to agree on job security in exchange for moderate wage increases, stable jobs are protected, but labor creation dwindles because technology is used to substitute automation for labor. On the other hand, when companies have free rein in labor-hiring practices, they tend to achieve their ideal labor force pattern: talent attracted with high salaries, perks, and a degree of autonomy, in exchange for commitment to the company; automation and off-shoring of the core labor force; and subcontracting of low-level service activities (such as cleaning or maintenance) to suppliers specializing in a lowly paid labor force. Thus, there is a wide range of variation of the transformation of labor in the new economy, depending on the level of development, and the institutional environment. In the developing world, the informal economy represents a fundamental component of the labor market. In advanced economies, the public-service sector becomes the refuge of employment for an increasing share of the work force expelled from traditional good-producing sectors. And entrepreneurship and innovation continue to thrive on the margins of the corporate sectors of the economy, increasing the numbers of self-employed as technology allows self-reliance in the control of the means of production of knowledge-based services, from the desk-top quality printer to online services. In sum, the occupational structure of our societies has indeed been transformed by new technologies. But the processes and forms of this transformation have been the result of the interaction between technological change, the institutional environment, and the evolution of relationships between capital and labor in each specific social context.

III

Perhaps the most apparent social change taking place in the years since this book was first researched is the **transformation of communication**, a trend that I analyzed in chapter 5 of this volume. Because the revolution in communication technologies has intensified in recent years, and because conscious communication is the distinctive feature of humans, it is logical that it is in this realm where society has been most profoundly modified.

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Computer networking, open source software (including Internet protocols), and fast development of digital switching and transmission capacity in the telecommunication networks led to the expansion of the Internet after its privatization in the 1990s and to the generalization of its use in all domains of activity. The Internet is in fact an old technology: it was first deployed in 1969. But it diffused on a large scale 20 years later, because of several factors: regulatory changes; greater bandwidth in telecommunications; diffusion of personal computers; user-friendly software programs that made it easy to upload, access, and communicate content (beginning with the World Wide Web server and browser designed by Tim Berners-Lee in 1990); and the rapidly growing social demand for the networking of everything, arising from both the needs of the business world and the public's desire to build its own communication networks. As a result, the number of Internet users on the planet grew from under 40 million in 1995 to about 1.5 billion in 2009. By 2009 rates of penetration reached more than 60 percent in most developed countries and were increasing at a fast pace in developing countries. Global Internet penetration in 2008 was still at around one-fifth of the world's population and fewer than 10 percent of Internet users had access to broadband. However, since 2000, the digital divide, measured in terms of access, has been shrinking. The ratio between Internet access in OECD and developing countries fell from 80.6:1 in 1997 to 5.8:1 in 2007. In 2005, almost twice as many new Internet users were added in developing countries as in OECD countries. China is the country with the fastest growth of Internet users, even though the penetration rate remained under 20 percent of the population in 2008. As of July 2008, the number of Internet users in China totaled 253 million, surpassing the United States, with about 223 million users. The OECD countries as a whole had a rate of penetration of around 65 percent of their populations in 2007. Furthermore, given the huge disparity of Internet use between people over 60 years of age and under 30 years of age, the proportion of Internet users will undoubtedly reach near saturation point in developed countries and increase substantially throughout the world as my generation fades away.

From the 1990s onward, another communication revolution took place worldwide: the explosion of wireless communication, with increasing capacity of connectivity and bandwidth in successive generations of mobile phones. This has been the fastest diffusing technology in the history of communication. In 1991 there were about 16 million wireless phone subscriptions in the world. By July 2008, subscriptions had surpassed 3.4 billion, or about 52 percent of the

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world population. Using a conservative user-multiplier factor we can safely calculate that over 60 percent of the people on this planet have access to wireless communication in 2009, even if this is highly constrained by income and the uneven deployment of communication infrastructure. Indeed, studies in China, Latin America, and Africa have shown that poor people give high priority to their communication needs and use a substantial proportion of their meager budget to fulfill them. In developed countries, the rate of penetration of wireless subscriptions ranges between 82.4 percent (the US) to 113 percent (Italy or Spain) and is moving toward saturation point. But also, in countries such as Argentina there are more mobile phone subscriptions than people.

In the 2000s we have witnessed increasing technological convergence between the Internet and wireless communication and multiple applications that distribute communicative capacity throughout wireless networks, thus multiplying points of access to the Internet. This is particularly important for the developing world because the growth rate of Internet penetration has slowed due to the scarcity of wired telephone lines. In the new model of telecommunications, wireless communication has become the predominant form of communication everywhere, particularly in developing countries. The year 2002 was the first in which the number of wireless subscribers surpassed fixed-line subscribers worldwide. Thus, the ability to connect to the Internet from a wireless device becomes the critical factor for a new wave of Internet diffusion on the planet. This is largely dependent on the building of wireless infrastructure, on new protocols for wireless Internet, and on the diffusion of advanced broadband capacity.

The Internet, the World Wide Web, and wireless communication are not media in the traditional sense. Rather, they are means of interactive communication. However, the boundaries between mass media communication and all other forms of communication are blurring. E-mail is mostly a person-to-person form of communication, even when carbon-copying and mass-mailing are taken into account. But Internet is much broader than that. The World Wide Web is a communication network used to post and exchange documents. These documents can be texts, audios, videos, software programs; literally anything that can be digitized. As a considerable body of evidence has demonstrated, the Internet, and its diverse range of applications, is the communication fabric of our lives, for work, for personal connection, for information, for entertainment, for public services, for politics, and for religion. The Internet is increasingly used to access mass media (television, radio, newspapers), as well as any form of digitized cultural or informational product (films, music,

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magazines, books, journal articles, databases). The Web has already transformed television. The teenagers interviewed by researchers at the University of Southern California (USC) Annenberg Center for the Digital Future do not even understand the concept of watching television on someone's else schedule. They watch entire television programs on their computer screens and, increasingly, on portable devices. So, television continues to be the major mass medium, for the time being, but its delivery and format is being transformed, as its reception becomes individualized. A similar phenomenon has taken place with the print press. All over the world, Internet users under 30 years of age primarily read newspapers on-line. So, although the newspaper remains a mass medium, its delivery platform changes. There is still no clear business model for on-line journalism. Yet, the Internet and digital technologies have transformed the work process of newspapers and the mass media at large. Newspapers have become internally networked organizations globally connected to networks of information on the Internet. In addition, the on-line components of newspapers have induced networking and synergy with other news and media organizations. Newsrooms in the newspaper, television, and radio industries have been transformed by the digitization of news and its relentless global/local processing. So, mass communication in the traditional sense is now also Internet-based communication in both its production and its delivery.

Furthermore, the combination of on-line news with interactive blogging and email, as well as Really Simple Syndication (RSS) feeds from other documents on the Web, have transformed newspapers into a component of a different form of communication: *mass self-communication*. This form of communication has emerged with the development of the so-called Web 2.0 and Web 3.0, or the cluster of technologies, devices, and applications that support the proliferation of social spaces on the Internet thanks to increased broadband capacity, open source software, and enhanced computer graphics and interface, including avatar interaction in three-dimensional virtual spaces. The development of horizontal networks of interactive communication that connect local and global in chosen time has intensified the pace and broadened the scope of the trend that I identified more than a decade ago: the formation of a multimodal, multichannel system of digital communication that integrates all forms of media. Furthermore, the communicating and information-processing power of the Internet is being distributed in all realms of social life, as the electrical grid and the electrical engine distributed energy in the process of formation of the industrial society. As people have appropriated new forms of communication, they have built their own

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systems of mass communication, via SMS, blogs, vlogs, podcasts, wikis, and the like. File sharing and peer-to-peer (p2p) networks make the circulation, mixing, and reformatting of any digitized content possible. New forms of mass self-communication have originated from the ingenuity of young users-turned-producers. One example is YouTube, a video-sharing website where individual users, organizations, companies, and governments can upload their own video content. In July 2007, YouTube launched 18 country-specific partner sites and a site specifically designed for mobile telephone users. This made YouTube the largest mass communication medium in the world. Websites emulating YouTube are proliferating on the Internet, including Ifilm.com, revver.com, and Grouper.com. Tudou.com is one of China's fastest growing and most popular video-hosting websites. Video streaming is an increasingly popular form of media consumption and production. A Pew Internet and American Life Project study found that in December 2007, 48 percent of American users regularly consumed online video, up from 33 percent a year earlier. This trend was more pronounced for users under 30, 70 percent of whom visit on-line video sites.

Thus, YouTube and other user-generated content web sites are means of mass communication. However, they are different from traditional mass media. Anyone can post a video in YouTube, with few restrictions. And the user selects the video she wants to watch and comment on from a huge listing of possibilities. Pressures are of course exercised on free expression on YouTube, particularly legal threats for copyright infringements and government censorship of political content in situations of crisis.

Horizontal networks of communication built around peoples' initiatives, interests, and desires are multimodal and incorporate many kinds of documents, from photographs (hosted by sites such as Photobucket.com) and large-scale cooperative projects such as Wikipedia (the open source encyclopedia) to music and films (p2p networks based on free software programs such as Kazaa) and social/political/religious activist networks that combine web-based forums of debate with global feeding of video, audio, and text. Thus, as analyst Jeffrey Cole reported to me, to teenagers who have the ability to generate content and distribute it over the net, it "is not 15 minutes of fame they care about, it is about 15 megabytes of fame".

Social spaces in the Web, building on the pioneering tradition of the virtual communities in the 1980s and overcoming the shortsighted early commercial forms of social space introduced by AOL, have multiplied in content and soared in numbers to form a diverse and widespread virtual society in the Web. MySpace remains the most

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successful website for social interaction as of early 2009, although it is largely inhabited by a young user population. But other formulas, such as Facebook, expanded the forms of sociability to networks of targeted relationships between identified persons of all ages. For hundreds of millions of Internet users under 30, on-line communities have become a fundamental dimension of everyday life that keeps growing everywhere, including China and developing countries, and their growth has only been slowed by the limitations of bandwidth and income. With the prospects of expanding infrastructure and declining prices of communication, it is not a prediction but an observation to say that on-line communities are fast developing not as a virtual world, but as a real virtuality integrated with other forms of interaction in an increasingly hybridized everyday life.

A new generation of social software programs have made possible the explosion of interactive computer and video games, today a multi-billion-dollar global industry. In its first day of release in September 2007, Sony's *Halo 3* earned $170 million, more than the weekend gross of any Hollywood film to date. The largest on-line game community, World of Warcraft (WOW), which accounts for just over half of the Massively Multiplayer Online Game (MMOG) industry, reached over 10 million active members (over half of which reside in the Asian continent) in 2008. If the media are largely entertainment-based, then this new form of entertainment, rooted entirely in the Internet and software programming, is now a major component of the media system.

New technologies are also fostering the development of *social spaces of virtual reality* that combine sociability and experimentation with role-playing games. The most successful of these is Second Life.[1] For many observers, the most interesting trend among Second Life communities is their inability to create Utopia, even in the absence of institutional or spatial limitations. Residents of Second Life have reproduced some of the features of our society, including many of its pitfalls, such as aggression and rape. Furthermore, Second Life is privately owned by Linden Corporation, and virtual real estate soon became a profitable business, to the point that the United States Internal Revenue Service started to develop schemes to tax the Linden dollars that are convertible to US dollars. Yet, this virtual space has such a communicative capacity that some universities have established campuses in Second Life; there are also experiments to use it as an educational platform; virtual banks open and go bankrupt following the ups and downs of the US markets; political demonstra-

1 Au (2008).

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tions and even violent confrontations between leftists and rightists take place in virtual cities; and news stories within Second Life reach the real world through an increasingly attentive corps of media correspondents.

Wireless communication has become a delivery platform of choice for many kinds of digitized products, including games, music, images, and news, as well as instant messaging that covers the entire range of human activity, from personal support networks to professional tasks and political mobilizations. Thus the grid of electronic communication overlies everything we do, wherever and whenever we do it. Studies show that the majority of mobile phone calls and messages originate from home, work, and school; the usual locations where people are, often equipped with a fixed phone line. The key feature of wireless communication is not mobility but perpetual connectivity, as a number of studies, including my own, have documented.

There is a growing interpenetration between traditional mass media and the Internet-based communication networks. Mainstream media are using blogs and interactive networks to distribute their content and interact with their audience, mixing vertical and horizontal communication modes. But there are many examples in which the traditional media, such as cable TV, are fed by autonomous production of content using the digital capacity to produce and distribute many varieties of content. Thus, the growing interaction between horizontal and vertical networks of communication does not mean that the mainstream media are taking over the new, autonomous forms of content generation and distribution. It means that there is a process of convergence that gives birth to a new media reality whose contours and effects will ultimately be decided by political and business power struggles, as the owners of the telecommunication networks position themselves to control access and traffic in favor of their business partners and preferred customers.

The growing interest of corporate media for Internet-based forms of communication recognizes the significance of the rise of a new form of societal communication, the one I have conceptualized as *mass self-communication*. It is mass communication because it reaches a potentially global audience through p2p networks and Internet connection. It is multimodal, as the digitization of content and advanced social software, often based on open source programs that can be downloaded for free, allows the reformatting of almost any content in almost any form, increasingly distributed via wireless networks. It also is *self-generated in content, self-directed in emission, and self-selected in reception* by many who communicate with many. This is a new communication realm, and ultimately a new medium,

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whose backbone is made of computer networks, whose language is digital, and whose senders are globally distributed and globally interactive. True, the medium, even a medium as revolutionary as this one, does not determine the content and effect of its messages. But it has the potential to make possible unlimited diversity and autonomous production of most of the communication flows that construct meaning in people's minds. This is why, observing more than a decade ago the emerging trends of what now has taken shape as a communication revolution, I proposed in the first edition of this book the hypothesis that a new culture is forming, *the culture of real virtuality,* in which the digitized networks of multimodal communication have become so inclusive of all cultural expressions and personal experiences that they have made virtuality a fundamental dimension of our reality.

IV

All major social changes are ultimately characterized by **a transformation of space and time in the human experience**. Thus, in this volume I undertook the analysis of these transformations, proposing a theoretical construction on the basis of available research on the subject. More than a decade later, it may be meaningful to evaluate the relevance of such construction in the light of the evolution of the spatial forms of societies around the globe, and of the emergence of new perceptions of time from the standpoint of social practice.

Let us start with space. In this volume I proposed a theory of urbanism in the Information Age based on the distinction between the space of places and the space of flows. This conceptualization has been widely discussed although not always understood, probably due to the obscurity of my formulation. My approach simply states that space is not a tangible reality, just as it is not from the point of view of natural science. It is a concept constructed on the basis of experience. And so, space in society is not the same as space in astrophysics or in quantum mechanics. If we look at space as a social form and a social practice, throughout history space has been the material support of simultaneity in social practice. That is, space defines the time frame of social relationships. This is why cities were born from the concentration of the functions of command and control, of coordination, of exchange of goods and services, of diverse and interactive social life. In fact, cities are, from their onset, communication systems, increasing the chances of communication through physical contiguity. I call space of places the *space of contiguity.* On the other hand, social practices as communication practices also took place at a distance

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through transportation and messaging. With the advent of electrically operated communication technologies, e.g. the telegraph and telephone, some measure of simultaneity was introduced in social relationships at a distance. But it was the development of microelectronics-based digital communication, advanced telecommunication networks, information systems, and computerized transportation that transformed the spatiality of social interaction by introducing simultaneity, or any chosen time frame, in social practices, regardless of the location of the actors engaged in the communication process. This new form of spatiality is what I conceptualized as the *space of flows*: the material support of simultaneous social practices communicated at a distance. This involves the production, transmission and processing of flows of information. It also relies on the development of localities as nodes of these communication networks, and the connectivity of activities located in these nodes by fast transportation networks operated by information flows. This analytical perspective may contribute to understanding the extraordinary transformation of spatial forms taking place throughout the world.

Indeed, since the original publication of this volume, the amount of the world's population living in urban areas has crossed the threshold of over 50 percent. Thus, instead of the end of cities, predicted by futurologists under the conditions of advanced telecommunications that would make spatial concentration of people and activities unnecessary, we find ourselves in the largest wave of urbanization in the history of humankind. Two-thirds of the population of the planet may be urban by 2030 and three-quarters by mid-century, according to a simple extrapolation of the growth of the current urban population. Advanced communication technologies have allowed greater concentration of population in a small number of areas on the planet, from where the rest of the world can be reached by telecommunicated computer networks and fast transportation systems. Yet, the urban form of the network society is historically distinct from past experience. The global process of urbanization that we are experiencing in the early twenty-first century is characterized by the formation of a new spatial architecture made up of global networks connecting major metropolitan regions and their areas of influence. Besides, the networking form of territorial arrangements extends to the intrametropolitan structure, so that our understanding of contemporary urbanization, as suggested in this volume, should start with the study of these networking dynamics both in the territories that are included in the networks and in the localities excluded from the dominant logic of global spatial integration. A stream of research conducted in the last two decades around the world, led by Peter Hall, William Mitchell,

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Michael Dear, Allen Scott, Anna Lee Saxenian, Peter Taylor, Amy Glasmeier, Jennifer Wolch, Stephen Graham, Saskia Sassen, François Ascher, Guido Martinotti, and Doreen Massey, among others, has shown the close interaction between the technological transformation of society and the evolution of its spatial forms. The most important characteristic of this accelerated process of global urbanization is that we are seeing the emergence of a new spatial form that I call the *metropolitan region*, to indicate that it is metropolitan though it is not a metropolitan area, because usually there are several metropolitan areas included in this spatial unit. The metropolitan region arises from two intertwined processes: extended decentralization from big cities to adjacent areas and interconnection of pre-existing towns whose territories become integrated by new communication capabilities. This model of urbanization is at the same time old and new. The metropolitan region is not just a spatial form of unprecedented size in terms of concentration of population and activities. It is a new form because it includes in the same spatial unit both urbanized areas and agricultural land, open space and highly dense residential areas: there are multiple cities in a discontinuous countryside. It is a multicentered metropolis that does not correspond to the traditional separation between central cities and their suburbs. There are nuclei of different sizes and functional importance distributed along a vast expanse of territory following transportation lines. Sometimes, as in the European metropolitan regions, but also in California or New York/New Jersey, these centers are pre-existing cities incorporated in the metropolitan region by fast railway and motorway transportation networks, supplemented with advanced telecommunication networks and computer networks. Sometimes the central city is still the urban core, as in London, Paris, or Barcelona. But often there are no clearly dominant urban centers. For instance, the largest city in the San Francisco Bay Area is not San Francisco but San José, the capital of Silicon Valley. Yet, San Francisco remains the key location for advanced services, while the East Bay includes a major university (Berkeley) and a biotechnology global hub (Emeryville). In other instances, as in Atlanta or in Shanghai, the new centers (North Atlanta, Pudong) are induced by the fast growth of new business services in the metropolitan region. In all cases, the metropolitan region is constituted by a multicentered structure (with different hierarchies between the centers), a decentralization of activities, residence, and services with mixed land uses, and an undefined boundary of functionality that extends the territory of this nameless city to wherever its networks go. In the early twenty-first century the metropolitan regions are a universal urban form. In the United States,

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in 2005, the Urban Land Institute defined 10 megalopolitan areas housing 68 percent of the American population. Yet, the largest metropolitan regions in the world are in Asia. The largest one, which I identified early in the first edition of this volume, is a loosely connected region that extends from Hong Kong to Guangzhou, incorporating the manufacturing villages of the Pearl River Delta, the booming city of Shenzhen, on the Hong Kong border, and the adjacent areas of Zhuhai and Macau, each one with a distinctive economy and polity, fully interdependent with the other components of this South China metropolitan region, with a population of approximately 60 million people. This prefigures the megapolitan future of China. These metropolitan regions constitute the heart of the new, increasingly globalized China, the manufacturing power house of the world in the twenty-first century. These "cities" are no longer cities, not only conceptually but institutionally or culturally. In some cases, they do not have a name. For instance, Los Angeles is not the appropriate name for the actual spatial form of which it is only a component, because the relevant spatial unit comprises the entire Southern California Metropolis that extends from Santa Barbara to San Diego and Tijuana across the border, in a pattern of continuously urbanized landscape along the coast that extends for about 100 miles inland. This is the undefined metropolitan region where 20 million people work, live, commute, and communicate by using a network of freeways, media coverage, cable networks, and wireline and wireless telecommunication networks, while retrenching in the polity of the localities of a fragmented territory and identifying their diverse cultures in terms of ethnicity, age, and self-defined social networks. The so-called Southland, in the terminology of the local media, does have a functional and economic unity, but no institutional or cultural identity.

In Europe, Peter Hall and Kathy Pain have identified the dynamics of the polycentric metropolis in the eight major regions of Europe they studied.[2] What they found is the persistence of urban centrality at the core of the region, in spite of the articulation between various urban centers. The overall spatial structure is polycentric and hierarchical at the same time. The residential settlement process has extended to exurbia, while many suburbs have become dense areas, sometimes dominated by high-rise buildings, and economic activities have decentralized along transportation lines, so that there is a mix of activities in the outlaying areas, while urban centrality functions are performed from various centers and sub-centers. The notion of residential suburban sprawl as a predominant urban form is outdated.

2 Hall and Pain (2006).

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The residential suburban sprawl observed by American urban studies in the 1960s and 1970s is no longer the predominant pattern, even in American metropolitan areas. Nowadays we observe a distributed centrality and a multifunctional spatial decentralization process. The key feature is the diffusion and networking of population and activities in the metropolitan region, together with the growth of different centers interconnected according to a hierarchy of specialized functions. Why so? What are the reasons for the formation of these metropolitan regions?

The key spatial feature of the network society is the networked connection between the local and the global. The global architecture of global networks connects places selectively, according to their relative value for the network. Recent urban research, as represented by Peter Taylor and the researchers at Loughborough University, demonstrates the importance of the global networking logic for the concentration of activities and population in the metropolitan regions. This is not only to say that these metropolitan regions are connected globally, but that the global networks, and the value that they process, need to operate from nodes in the network. The financial centers in London, Tokyo, or New York have not produced a global financial market made of telecommunicated computer networks and information systems. The global financial market has restructured and strengthened the places, old and new, from where global capital flows are managed. They are not global cities but global networks that structure and change specific areas of some cities through their connections. After all, much of New York (e.g. Queens), Tokyo (e.g. Kunitachi) and London (be it Hampstead or Brixton) are very local, except for their immigrant populations. The global functions of some areas of some cities are determined by their connection to the global networks of value making, financial transactions, managerial functions, or otherwise. And from these nodal landing places, through the operation of advanced services, expands the economic and infrastructural foundation of the metropolitan region. So the changing dynamics of networks, and of each specific network, explains the connection to certain places rather than the places explaining the evolution of the networks. The points of connection in this global architecture of networks are the points that attract wealth, power, culture, innovation, and people, innovative or not, to these places. For these places to become nodes of the global networks they need to rely on a multidimensional infrastructure of connectivity: on air, land, and sea multimodal transportation; on telecommunication networks; on computer networks; on advanced information systems; and on the whole infrastructure of ancillary

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services (from accounting and security to hotels and entertainment) required for the functioning of the node. Every one of these infrastructures needs to be served by highly skilled personnel, whose needs have to be catered to by service workers. These are the ingredients for the growth of the metropolitan region. Knowledge sites and communication networks are the spatial attractors for the information economy as the sites of natural resources and the networks of power distribution determined the geography of the industrial economy. And this is valid for London, Mumbai, São Paulo, or Johannesburg. Every country has its major(s) node(s) that connect the country to strategic global networks. These nodes underlie the formation of metropolitan regions that determine the local/global spatial structure of each country through their internal, multilayered networking. Outside the landing places of networked value creation lie the spaces of exclusion, or "landscapes of despair", borrowing the concept from Dear and Wolch,[3] either intra-metropolitan or rural.

Why do these global networks linked through nodes need to land in some specific metropolitan regions? Why cannot the processing of highly abstract operations free itself from spatial constraints? Here I refer to the classic analysis by Saskia Sassen on the formation of the global city as a specific urban form.[4] What is important in the location of advanced services is the micro-network of the high-level decision-making process, based on face-to-face relationships, linked to a macro-network of decision implementation, which is based on electronic communication networks. In other words, meeting face to face to make financial or political deals is still indispensable, particularly when discussions must proceed with absolute discretion in the case of decisions that provide a competitive edge. In the locational decisions of the managerial functions of business corporations, the intangible factor is still access to the micro-networks located in certain selective places, in what I named "milieus". They can be financial milieus (e.g. New York, London, Tokyo) but also technological milieus like Silicon Valley or other centers of technological innovation around the world, or media production milieus, such as Los Angeles or New York. The key innovation and decision-making processes take place in face-to-face contacts, and they still require a shared space of places, well-connected through its articulation to the space of flows.

What is fundamentally new is that these nodes interact globally, instantly or at chosen times throughout the planet. So the network of

3 Dear and Wolch (1987).
4 Sassen (1991).

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decision implementation is a global electronic macro-network, while the network of decision-making and the generation of initiatives, ideas, and innovation is a micro-network operated by face-to-face communication concentrated in certain places. This spatial architecture simultaneously explains the concentration of some metropolitan places and network diffusion: the space of places and the space of flows. Once this mechanism is identified, everything else can be explained: concentration of ancillary services, communication infrastructure that develops in one site and not in others, attraction of talent, good living conditions for the creators of value, attractiveness to their would-be immigrant servants, and so on.

Communication infrastructures are decisive components of the process of mega-metropolitanization but they are not the origin of the process. Infrastructure of communication develops because there is something to communicate. It is the functional need that calls for the development of infrastructures. The value-making locales offer greater opportunities and better services, and this offer attracts talented and innovative professionals. And because there is money, there is a thriving market and there are better cultural amenities, educational facilities, and health services, and therefore jobs which are still the main source of urban growth. Since jobs are appealing globally, these metropolitan regions also become the hubs for immigration. They develop as multi-ethnic places and establish global connections not only at the level of functional and economic interactions, but at the level of interpersonal relations – the networks of cultures, and the networks of people, analytically captured by the concept of transnationalism from below. At the source of the process of metropolitanization, there is the ability to concentrate production of services, finance, technology, market, and people. This creates economies of scale, as in previous forms of urbanization, as well as economies of synergy which are the most important nowadays. Spatial economies of synergy mean that being in a place of potential interaction with valuable partners creates the possibility of adding value as a result of the innovation generated by this interaction. Economies of scale can be transformed by information and communication technologies in their spatial logic. Electronic networks allow for the formation of global assembly lines. Software production can be spatially distributed and coordinated by communication networks. On the other hand, economies of synergy still require the spatial concentration of interpersonal interaction because communication operates on a much broader bandwidth than digital communication at a distance. This is why scientific research is still concentrated in campuses around the world while, at the same time, these campuses

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cannot operate without being networked with the world wide web of science.

Now, the most strategically important observation for an analysis in terms of spatial networks is that these global networks do not have the same geography; they usually do not share the same nodes. The network of innovation in information and communication technology, the network of which Silicon Valley is a major node, is not the same as the network of finance, except in that the network of venture capital typically originated from inside the high-technology industry. Political agencies, nationally and internationally, build their own spatial sites and networks of power. The global network of scientific research does not overlap with the networks of technological innovation. That is why so many are surprised by the failures of projects aimed at developing new Silicon Valleys around a new university. Artistic creativity also has its own network, which shifts constantly, depending on fields of arts and movements of fashion. The global criminal economy (accounting for 5 percent of global GDP) is built on its own specific networks with nodes that do not generally coincide with those of finance or technological innovation. The management of drug traffic features places such as Cali, Mexico City, Tijuana, Miami, Bangkok, Kabul, or Amsterdam, most of them secondary nodes for other major networks. Therefore there is a multilayering of global networks in the key strategic activities that structure and destructure the planet. When these multilayered networks overlap in some node, when there is a node that belongs to different networks, two major consequences follow. First, economies of synergy between these different networks take place in that node: between financial markets and media businesses; or between academic research and technology development and innovation; between politics and media. In addition, because these multilayered networks land on particular places, and many networks share a node in such places, these localities become mega-nodes: they become switching nodes for the entire global system, connecting various networks. London and New York are typical cases of this multiple nodal advantage. Boston does not reach the same level because even if it is probably the dominant node in academic research and an important node in technological innovation (particularly in biotechnology), it is only a secondary node in financial networks, and is subsidiary to other nodes in a number of important dimensions of wealth and power. This is also another reason why in China there is a clear differentiation between Beijing and Shanghai in terms of the nodes and the distinct role they play in the global architecture: Beijing focusing on the political, financial, scientific, and technological; Shanghai specializing in financial networks and global trade. These mega-nodes are the

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urban dimension of multilayered global networks. To understand the dynamics and meaning of the node we must start with the analysis of the networks, of each one of the different networks, and of their interaction as facilitated by their spatial convergence. However, each mega-node becomes an attractor of capital, labor, and innovation. Here is where the contradictions arise. A mega-node attracts resources and accumulates opportunities to increase wealth and power. At the same time, because it rarely has the institutional existence or the political capacity of autonomous decision-making as a metropolitan region, it can hardly implement policies on behalf of the needs of the local. In the absence of active social demands and social movements the mega-node imposes the logic of the global over the local. The net result of this process is the coexistence of metropolitan dynamism with metropolitan marginality, expressed in the dramatic growth of squatter settlements around the world, and in the persistence of urban squalor in the *banlieues* of Paris or in the American inner cities. There is an increasing contradiction between the space of flows and the space of places. These mega-nodes concentrate more and more wealth, power, and innovation on the planet. At the same time, few people in the world feel identified with the global, cosmopolitan culture that populates the global networks and becomes the worship of the mega-node elites. In contrast, most people feel a strong regional or local identity. Thus global networks integrate certain dimensions of human life and exclude other dimensions. The contradictory relationship between meaning and power is manifested by a growing disassociation between what I conceptualized as the space of flows and the space of places. Although there are places in the space of flows and flows in the space of places, cultural and social meaning is defined in place terms, while functionality, wealth, and power are defined in terms of flows. And this is the most fundamental contradiction emerging in our globalized, urbanized, networked world: in a world constructed around the logic of the space of flows, people make their living in the space of places.

V

Humans experience time in different ways depending on how their lives are structured and practiced. Throughout history time was defined by a sequence of practices and perceptions. But the intervals and pace of the sequence were highly diverse, depending on social organization, technology, culture, and the biological condition of the population.

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Organizing time was a mark of the sovereign power of kings and priests. For the common people, time was established by the recurrence of the sun and the moon, by agricultural cycles, and by the weather seasons that would bring some regular pattern of sequencing into their perception. Solar clocks would offer a level of measure, provided it was sunny, but the parceling of time into small, precise accounting units, such as hours and minutes, had to wait for the advent of mechanical technology. Moreover, as long as there was no need for this precision, the sequence of time was vaguely perceived, as with societies in the Middle Age, for whom fairs marked the coming together of agricultural production and trade, sociability, and festivity. Religious celebrations, often associated with the agricultural cycle, would also provide benchmarks in an otherwise undetermined accumulation of experience that would not go much further than the distinction of day and night and the time of meals, for those who could have more than one meal. Everything changed with the invention of the clock and the industrial age. Production was organized around the control of time, ultimately perfected in the Taylorist factories of Henry Ford and Vladimir Ilitch. Working time defined life time. The strict definition of time became a major tool to discipline society, as the rhythm of everything was counted and valued, and people fought to gain their own time beyond their subdued working time.

Under capitalism, time became money, as the rate of turnover of capital became a paramount form of profit-making. The faster you could secure your return, and the faster you could reinvest it, the greater the profits to be made. Finance became constructed around the sale of monetized time. Credit was based on time. Speed became essential in financial transactions. The more capitalism went global, the more differences in time zones made possible the proliferation of interdependent financial markets to ensure the movement of capital around the clock. And so, a new form of time emerged in the financial markets, characterized by the compression of time to fractions of a second in financial transactions by using powerful computers and advanced telecommunication networks. Furthermore, the future was colonized, packaged, and sold as bets on future valuation, and as options between various future scenarios. Time as sequence was replaced by different trajectories of imagined time that were assigned market values. There was a relentless trend towards the annihilation of time as an orderly sequence, either by compression to the limit or by the blurring of the sequence between different shapes of future events. The clock time of the industrial age is being gradually replaced by what I conceptualized as *timeless time*: the kind of time that occurs

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when in a given context, such as the network society, there is systemic perturbation in the sequential order of the social practices performed in this context.

I first found the traces of timeless time while analyzing the workings of financial networks. But it also appeared in a wide range of social domains, when every time sequence was cancelled or blurred. We can see this in the attempt to control the biological clock of the human body by medical science's capacity to allow women to conceive a child at an age of their choosing, going beyond the limits of their biologically programmed fertility age. Or in professional work, with the end of predictable career patterns, the development of flextime, and the end of the separation of working time, personal time, and family time, as in the penetration of all time/spaces by wireless communication devices that blur different practices in a simultaneous time frame through the massive habit of multi-tasking. The attempt to annihilate time is also present in our everyday life: everybody rushes to do more in less time, in a trend that has been analyzed as the acceleration of time. This widespread social practice is the consequence of organizing our entire life around units of time that determine what we can do within chronological boundaries in separate spaces. To work full time, pick up the kids from school (on a different, often incompatible schedule), do the shopping, take care of domestic chores, and manage the multiple bureaucratic tasks on which daily life depends, we try to be present and on time everywhere by using technology (fast transportation, calls on the run) and pumping up ourselves to the frantic race of everyday life. Because organizations continue to be clock-based but people are increasingly on flex-time and move between different time regimes, multi-tasking and multi-living through acceleration by the means of technology epitomizes the trend to reach timeless time: the social practice that aims at negating sequence to install ourselves in perennial simultaneity and simultaneous ubiquity. Why do people rush all the time? Because they can beat their time constraints, or so they think. Because the availability of new communication and transportation technologies encourages them to pursue the mirage of transcending time.

War also changed with technology, as the dominant technological powers, weary of the hesitation of their citizens to engage in lengthy, costly wars, aimed to conduct what I called "Instant Wars", using remotely controlled smart bombs and missiles to inflict unbearable damage to the enemy, thus forcing a quick surrender. Of course, such schemes did not work as planned, as the wars in Iraq and Afghanistan have painfully shown. But there was, and still is, the project of compressing war time by using electronically networked military

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technology. This is what timeless time is: it is not the only form of time, but it is the time of power in the network society, as it was the time of the powerful when they established the calendar, including the year that marked the beginning of time in antiquity. Which brings us to the question of the time dimension of counterpower. And more generally, the larger question of alternative forms of time conceptions in our society.

While timeless time is the time of the dominant functions and powerful social actors in the network society, it coexists with biological time, when the rhythm of the body determines the sequence of life and death, and with clock time, as a large majority of humankind is still chained to the fields and ordered into manufacturing assembly lines. Time is a social form, and societies are constituted by different social forms resulting from various layers of social organization that are mixed in the periods of historical transition, such as the transition from the nation-based industrial society to the global network society. Thus, different social forms coexisting in a society induce different time forms present at the same time in people's practices.

Yet, there are alternative forms of conceiving and practicing time linked to alternative projects of organizing society. The most important alternative expression of time that I identified in this book is what I called, using a concept from Scott Lash and John Urry,[5] "glacial time". This is a slow-motion time that human perception assigns to the evolution of the planet. It is sequential time, but moving so slowly, as perceived from the brevity of our lives, that it seems to us to be eternal. And in fact it is, because we can only follow the planetary sequence when we rejoin nature in the eternity. This is the conception of time present in the environmental movement when activists declare intergenerational solidarity. Our attempt to prevent the worsening of global warming is a shared practice with the grandchildren of our grandchildren: a practice that we need to engage in to undo what previous generations did, and what we are still doing, in total disregard for our children's planet. When time is perceived and constructed under these terms, a new form of sequence emerges in social practice, directly confronting the suicidal attempt to annihilate time in the mad rush to squeeze every second out of our lifetime, under the illusion that we enjoy life at its fullest by relentlessly pursuing the instant pleasure of our fantasies; or by jumping our minutes in the attempt to extricate ourselves from the maze of a self-generated frenzy. Timeless time and glacial time embody the

5 Lash and Urry (1990).

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fundamental struggle taking place in the network society between the taming of the technological forces unleashed by human ingenuity and our collective submission to the automaton that escaped the control of its creators.

The trends observed in the last decade seem to support the relevance of this analysis of the transformation of time, however abstract it appears to be. The process of globalization has accelerated the tempo of production, management, and distribution of goods and services throughout the planet, measuring productivity and competition by shrinking time to the lowest possible level. Global financial markets have invented time-trading derivatives that spiraled out of control and threaten to destroy the economy they were supposed to fuel. The intensification of the exploitation of natural resources, and the refusal to plan their renewable use over time, has shortened the time horizon of our livelihood as a species while extending our life expectancy as individuals. The virtual reality that dominates our experience has cancelled the notion of time, as we live in the ever-present world of our avatars.

And while famines and catastrophes remind us of our vulnerability to biological time, the extraordinary advances of genetic engineering are propelling humans into the illusion of controlling their bodies and regenerating their cells, thus pushing to an indefinite future the ultimate time limit of our existence: death.

In the last decade, the struggle over time has set the stage for the fundamental conflict of our society: a new culture of nature against the culture of the annihilation of time, which is tantamount to the canceling of the human adventure.

VI

Theory and research are only as good as their ability to make sense of the observation of their subject matter. The value of social research does not derive only from its coherence, but from its relevance as well. It is not a discourse but an inquiry. This is why throughout this book, with all its limitations, there is a constant attempt to relate the identification of a series of social processes and organizational forms with their role in the constitution of a new form of society: the network society. The continuing investigation of social evolution in the last decade yields a number of findings that directly relate to the analysis presented in this book. Although I did not predict anything, and I will continue not to do so, I believe there is some connection between the phenomena that I considered to be the key components

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of the network society and the trends and social forms that characterize our world at the end of the first decade of the twenty-first century. The technological revolution, with its two major and interrelated fields, in micro-electronics-based communication technologies and genetic engineering, has continued to accelerate, transforming the material basis of our lives. Networks have become the predominant organizational form of every domain of human activity. Globalization has intensified and diversified. Communication technologies have constructed virtuality as a fundamental dimension of our reality. The space of flows has taken over the logic of the space of places, ushering in a global spatial architecture of interconnected mega-cities, while people continue to find meaning in places and to create their own networks in the space of flows. Timeless time spreads as a mantle of meaninglessness as global environmental consciousness rises in defense of glacial time as a shared practice with our grandchildren. There is a clear echo between the major issues of our society and the analyses written a decade ago in the book you are about to read. If you think that the approach I proposed, in spite of its obvious flaws, relates to your experience, this is all the comfort this author needs to peacefully fade away.

Manuel Castells
Santa Monica, California
March 2009

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The volume you have in your hands is a substantially revised edition of this book, originally published in November 1996. The current version was elaborated and written in the second half of 1999. It aims at integrating important technological, economic, and social developments that took place in the late 1990s, generally confirming the diagnosis and prognosis presented in the first edition. I have not modified the key substantive elements of the overall analysis: mainly because I believe that the core argument still stands as presented, but also because all books are of their time, and must eventually be superseded by the development and rectification of the ideas they contain, as social experience and research add new information and new knowledge. Besides updating some of the information, I have corrected a few mistakes and have tried to clarify and strengthen the argument wherever possible.

In so doing, I have benefited from many comments, criticisms, and contributions from around the world, generally expressed in a constructive and cooperative manner. I cannot do justice to the richness of the debate that this book has engendered, to my great surprise. I just want to express my heartfelt gratitude to readers, reviewers, and critics, who took the time and effort to think about the issues analyzed in these pages. I cannot claim to be aware of all the comments and discussions in a variety of countries and in languages which I do not understand. But, by thanking those institutions and individuals who, by their comments and the debates they organized, have helped me to better understand now the questions I treated in this book, I wish to extend this acknowledgment to all readers, and commentators, wherever and whoever they are.

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